DOCUMENT RESUME

ED 054 865	PS 005 015
AUTHOR	Schaefer, Earl S.; Aaronson, May
TITLE	Infant Education Research Project: Implementation and Implications of a Home Tutoring Program.
INSTITUTION	National Inst. of Mental Health (DHEW), Chevy Chase, Md. Center for Studies of Child and Family Mental Health.
PUB DATE	[70]
NOTE	42p.; Paper is to appear as a chapter in a book on Conceptualizations of Preschool Curricula, Ronald K. Parker, Ed., City University of New York, New York
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	*Disadvantaged Youth; Games; *Home Instruction; *Infants; *Intellectual Development; Intelligence Quotient; Language Skills; Parent Attitudes; Staff Orientation; Toys; *Tutoring
IDENTIFIERS	Bayley Infant Mental Test; Johns Hopkins Perceptual Test; Peabody Picture Vocabulary Test; Stanford Binet

ABSTRACT

The Infant Education Research Project was designed to facilitate the intellectual development of disadvantaged children through a program of home tutoring during the second and third years of life. An experimental group of 31 Negro male infants and a control group of 33 Negro male infants were selected from door-to-door surveys of two lower-socioeconomic neighborhoods in Washington, D.C. Tutors visited the home of each experimental infant for an hour a day, five days a week, beginning when the infant reached 15 months of age and continuing through 36 months. Participation of the mother was encouraged but not required. Tutors were carefully selected and specially trained to make maximum use of teaching materials such as toys, books, music and rhythm, puzzles, games, and to provide children with the experiences of walks and excursions. Pleasant interpersonal relationships were encouraged and maintained at all levels of the project. Posttest gains confirm the success of the program for the experimental infants. However, it is suggested that tutoring should begin before 14 months of age. Four generalizations about the educational process in relation ot program development are also made. (WY)

ED054865

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TITLE: Infant Education Research Project: Implementation and Implications of a Home Tutoring Program

AUTHORS: Earl S. Schaefer and May Aaronson

ADDRESS: Section on Early Child Care Research
Center for Studies of Child & Family Mental Health
National Institute of Mental Health

PUBLICATION: To be incorporated as a chapter in a book on Conceptualizations of Preschool Curricula, to be edited by Dr. Ronald K. Parker, Center for Advanced Study in Education, The City University of New York, New York, New York.

PS005015

Infant Education Research Project: Implementation and Implications of a Home Tutoring Program

The infant Education Research Project was designed to facilitate the intellectual development of disadvantaged children through a program of home tutoring during the second and third years of life. The initial motivation for the development of the project was provided by research data that showed that most social groups reach a stable IQ level during the preschool years. A reported negative correlation of mean IQ with age for a sample of minority group elementary school children was interpreted as produced by the sampling method which resulted in unrepresentative samples in the upper and lower age ranges (Kennedy, Van de Riet, and White, 1963). The critique concluded that "a low mean IQ developed during the preschool years and remained stable during the elementary school years" and suggested "a need for research on factors related to intellectual development in the preschool years and for preschool programs designed to raise the level of intellectual functioning of culturally deprived children" (Schaefer, 1965).

A review of research on early intellectual development suggested that differences between social groups in intellectual functioning emerge during the second and third years of life. Mean IQ's by fathers' occupations, reported by Terman and Merrill, (1937) showed that differences between occupational groups for children between two years and five and one half years of age were comparable to those for later ages. Bayley (1965) reported no significant differences between groups in comparison of scores for ages one through fifteen months by sex, birth order, race, parental

education, or geographic residence. Francis-Williams and Yule (1967) have confirmed these findings for an English sample. Hindley (1965) also found little difference between socioeconomic groups for English children at eighteen months of age but substantial differences by three years of age. Van Alstyne (1929) also reported substantial correlations of socioeconomic indicators with Kuhlmann-Binet scores and vocabulary scores at three years of age.

These replicated findings of essentially no difference between social groups in mental test scores at fifteen to eighteen months but substantial differences at three years suggested that mental-test scores may be measuring different functions at different ages. Bayley's (1949) intercorrelations of mental test scores from repeated tests between birth and eighteen years have been factor-analyzed by Hofstaetter (1954) and reanalyzed by Cronbach (1967). Both analysts agree that the intercorrelations show that the tests are measuring different functions at different ages. Cronbach (1967) convincingly argues that the analysis cannot reveal distinct qualitative stages of mental development but suggests that "Many sorts of developmental research provide a basis for arguing that the available tests tap different processes at different ages, and for arguing that mental development goes through qualitative stages." Different correlations with socioeconomic status variables at different ages provide some evidence that the tests are measuring different functions at different ages.

Unpublished findings of substantial intercorrelations of mental and motor tests during the first year of life but insignificant correlations as the child approaches two years of age also suggest that different functions are being measured at those ages. Since neither the early mental nor the early motor tests have significant correlations with later mental tests, the importance of early sensory-motor development for subsequent intellectual functioning or achievement is questionable. These data suggested that other variables should be stressed to achieve a long-term goal of higher intellectual functioning. The analysis also suggests that the importance of early sensory and motor development for later intellectual development must be proven rather than assumed, for existing longitudinal data would not support that view.

The findings of very low correlations between early mental-test scores and later mental-test scores would not support an assumption that accelerating an early stage of development would accelerate or increase level of functioning at a subsequent uncorrelated stage of development. The need for additional longitudinal research on the interrelationships of differences in cognitive functioning at different ages and the need for study of both long-term and short-term effects of early intellectual stimulation is suggested by these analyses of mental-test data.

Evidence that early mental and motor skills do not predict later development, and that differences between social groups emerge during the second and third years of life, influenced the major focus of the Infant Education Research Project. Examination of infant mental tests

showed an increasing emphasis upon language-development items during the second year of life that parallels the child's rapid increase in the use of language. Van Alstyne (1929) had reported very high correlations between Kuhlmann-Binet scores and scores on her vocabulary test at age three. Miner (1957) reviewed the literature on the intercorrelations of vocabulary scores and Wechsler-Bellevue and Stanford-Binet scores and found that typically the correlations are above .80. Miner also found that vocabulary correlates as highly with these two major mental tests as they correlate with one another. Bradway (1945) analyzed Stanford-Binet items from tests given during the preschool years into verbal, non-verbal, and memory components and reported that verbal scores had higher correlations with later intelligence than did the non-verbal scores. Bayley (1966) isolated several factors from mental-test items administered between two and six years of age and found that a factor of verbal knowledge yields the highest predictions of later intelligence. The researches that provide evidence that verbal scores are better predictors of future intelligence, that vocabulary is highly correlated with mental-test scores and with occupational and academic achievement, and that differences among socioeconomic groups in intellectual functioning emerge during the second and third years of life--the period of early verbal development--dictated both the focus upon language development and the choice of fifteen months as the age at which tutoring was begun.

The hypothesis that providing additional intellectual stimulation could produce higher levels of intellectual functioning in lower-socioeconomic-status Negro infants was derived from both correlational studies

and intervention studies on early intellectual development. Van Alstyne (1929) had found sizable correlations between parent practices, such as reading to the child, and the child's vocabulary even after partialling out the effects of mother's intelligence. Milner (1951) reported that low scorers on readiness tests less frequently shared mealtime conversations with their parents, experienced less affection from their parents, had fewer books and were read to less often, and had received more direct physical punishment. Bayley and Schaefer (1964) found that maternal behavior ratings during the first three years of life of Equalitarianism and Positive Evaluation of the Child were positively correlated; and Irritability, Punitiveness, Perceives the Child as a Burden, and Ignoring were negatively correlated with intelligence-test scores of sons during the school years. Hurley (1965, 1967) has also reported that measures of parental acceptance versus rejection are correlated with intelligence-test scores of children.

Socioeconomic status variables tend to be correlated with parental care of children as well as with intelligence test scores of children (Bayley and Schaefer, 1960). Moore's (1968) finding, that parental variables correlate with intellectual development of the child even after partialling out socioeconomic status, suggests that socioeconomic status gains much of its predictive power as an index of environment rather than as an index of genetic influences. Research that has demonstrated changes in intellectual functioning following changes in environmental influences would support this interpretation.

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Skeels and Harms (1943) and Skodak (1939) found that children in adoptive homes acquire far higher intelligence than their mentally retarded or lower-socioeconomic-status natural parents. Skeels and Dye (1939) found that children transferred from an orphanage nursery with little stimulation to the care of older girls in an institution for the mentally retarded showed large gains in IQ while a contrast group showed losses in IQ in the orphanage. Dawe's (1942) program of verbal stimulation for orphanage children produced marked gains in intelligence, and Kirk (1958) reported significant gains for children enrolled in a special training program for children committed to an institution while control children showed decreases in mental-test scores. Irwin's (1960) finding that reading stories to children between 13 and 30 months old produces significant increases in language usage also demonstrated that experience can influence language development. Hunt's (1961) book, "Intelligence and Experience" and Fowler's (1962) review of "Cognitive Development During Infancy" provided further support for the hypothesis that changes in intellectual stimulation could produce changes in IQ in lower SES Negro infants.

Formulation of Objectives

The review of correlates of early intellectual development and of intervention research designed to improve intelligence-test scores contributed greatly to determining the objectives of the project. Although the ultimate objective of the project was to increase academic achievement, increasing level of intellectual functioning, particularly

in the area of language skills, was the major immediate objective, and criterion of success, of the project. Formulation of subordinate objectives was influenced by the longitudinal data from the Berkeley Growth Study on maternal behavior, child behavior, child intelligence-test scores, and their intercorrelations from infancy through adolescence (Schaefer and Bayley, 1963; Bayley and Schaefer, 1964). Major findings of that research included evidence that maternal loving acceptance had significant positive correlations while maternal hostile rejection had negative correlations with task-oriented behaviors as well as intelligence-test scores, particularly for males. Task-oriented behaviors that were included in that study included consistent cooperation, attentiveness to instructions, low distractibility, persistent effort, interest, and systematic methods of task-performance. These findings of the relationship between maternal care and task-oriented behavior suggested an objective of developing cooperation interests, attentiveness, and persistence in completion of tasks. The relationships that were found among task-oriented behaviors, intelligence, the child's positive relationships, and the quality of maternal care influenced the plans for infant intellectual stimulation.

Review of research on intellectual development suggested that the major components of an infant-education project should be: 1. Development of a positive relationship with the child, and in a home-tutoring project, with his family; 2. providing the child with varied and increasingly complex experience; 3. providing the child with age-appropriate language

stimulation. This conceptualization of an intellectual stimulation program did not suggest a specific, limited curriculum but rather the need for a broad range of methods for promoting development. Therefore the program of home tutoring was designed to provide the types of experience and verbal interaction that typically occur in a highly motivated, middle-class family.

Project Design

An experimental group of 31 Negro male infants and a control group of 33 Negro male infants were selected from door-to-door surveys of two lower-socioeconomic neighborhoods in Washington, D. C. Although experimental and control cases were chosen from different neighborhoods, children from the two neighborhoods have comparable readiness scores at school entrance. Only families that had agreed to participate in either the experimental or control group were included. Families that did not meet two of the three criteria--family income under $5000, mother's education under 12 years, and mother's occupation, if any, either unskilled or semiskilled--were excluded as were homes judged to be too crowded or unsuitable for home tutoring. Comparisons between the groups revealed only small differences, many of which favored the control group, on family variables that might be expected to influence the child's intellectual development.

Tutors visited the home of each experimental infant for an hour a day, five days a week, beginning when the infant reached 15 months of age

and continuing through 36 months. Participation of the mother and of other family members in the education of the infant was encouraged but not required.

Intelligence tests were administered at a center by experienced psychologists to both experimental and control infants at 14, 21, 27, and 36 months, and ratings were made of test behavior. From their observations of the experimental group during tutoring sessions, tutors provided data on the home environments and experiences of the infants, on maternal behavior, and on the social and emotional behavior and language development of the infants. Reliability of these data could be determined from the independent reports of the two tutors who visited an infant on alternate weeks. Daily visits to the home over an extended period yielded more valid data on the home environments of the experimental infants than are usually obtained in behavioral research.

Recognition of the tutor-child relationship as the most important part of the progaam led to an emphasis on staff selection, training, supervision, and support in the development of the project. The curriculum was to be developed during the course of the project from methods and materials evaluated by the tutors. Because of the initiative and innovativeness required from the tutoring staff, the training, supervision, and group support of the tutors was designed to develop and maintain enthusiasm, morale, and an optimal performance level.

Selection of Tutors

Tutors were selected from among college graduates because of the high level of functioning required for participation in curriculum development and collection of scientific data. Applicants were judged for pertinent training and experience on the basis of written applications and interviews. Brief essays on structured topics, incorporated as part of the written applications, helped the staff to explore motivations for affiliation with the project and attitudes toward disciplining and interrelating with young children. Personal interviews helped to provide information on warmth of personality, sense of dedication, and personal familiarity with ghetto conditions, as well as on previous training and experience with young children. The tutors selected came from diverse backgrounds. The educational supervisor, or head tutor, was a speech therapist. Others had backgrounds in psychiatric nursing, psycholinguistics, child development, and as teachers in nursery school, Head Start programs, Montessori preschool, and elementary school. Dancing, music, special education, psychology, and sociology degrees were represented. All had previous inner-city involvement and experience with young children.

Training of Tutors

Training proceeded simultaneously with recruitment of the sample. Even though of necessity recruitment was the first task assigned to the tutors, it in fact proved to be a valuable training device. Their efforts, which took them from door to door in both the experimental and control

neighborhoods and required them to complete interview schedules on over two hundred families, caused them to learn first-hand of the effects of poverty and over-crowded living conditions and to become acquainted with a variety of children and parents in their home environments.

The training program alternated group sessions and workshops with field observations and actual practice with babies. Outside reading was encouraged, and a small library was established of pertinent books, pamphlets, and journal articles covering a broad range of relevant subjects from Montessori and Russian Day Care of Infants to The National Safety Council's Safety Guidelines for Babysitters. Films were shown on early child care. Palmour Street, depicting the daily life of a Negro family in a small Southern town, described both negative and positive influences that parents can have on the mental and emotional development of their children. Abby's First Two Years demonstrated the physical and behavioral changes of infancy and childhood in reverse sequence from two years down to two months.

Throughout the initial training period, and as part of on-going training after the tutoring was under way, various specialists spoke to the tutors on subjects related to child development. Particularly effective were those who related first-hand accounts on "how-to-do-it." Among these was a mother who had published a book on the education of her physically and neurologically handicapped infant son. Another demonstrated language-development techniques which had proved successful in the education of her two adopted children. One of the tutors, a

former Montessori teacher, gave a series of talks on preparation of the learning environment and Montessori-oriented language instruction. Her talks stimulated interest in the written works of Maria Montessori, of which The Absorbent Mind (1963 translation) was most read and discussed. Stoner's (1914) most detailed "how-to-do-it" book, describing her precocious daughter's early education, stirred lively discussions of methodology and principles of education. Pertinent scientific journal articles were read and discussed. Representative was Dawe's (1942) report of a successful orphanage intervention program with a curriculum based on training the children in the comprehension of words and concepts, looking at and discussing pictures, listening to poems and stories, and going on short trips and excursions.

The tutors made observations of fifteen-month infants in a variety of settings including orphanages, a welfare department's institution for homeless and neglected children, and middle-class homes. Middle-class mothers contributed lists of toys, activities, games, music, books, pictures, descriptions of trips and room decorations used in the education of their young children.

Each tutor conducted practice sessions at the Center with non-sample infants, observed and evaluated in turn by the others. This was followed by a two week pilot trial of all procedures developed for intervention, reporting, and data collection, each tutor visiting the home of a non-sample baby every day in the prescribed manner. The tutors reported that this last exercise gave them the assurance they needed to undertake the intervention.

Staff Relationships

The unique nature of the collaboration with the tutors, participation of the entire staff in planning and trouble shooting, and morale-building elements embedded in the network of interrelationships, all contributed immeasurably toward sustaining a high level of enthusiasm and dedication among the personnel. Most of the tutoring took place in environmentally difficult situations in which the tutors were not always able to remain aloof from the stresses and traumatic events that invaded the lives of the families. Overcrowding, compounded when school-age children were home for holidays and the summer months, sometimes raised almost insurmountable obstacles to the child-centered approach of the program. The tutors were continuously being faced with problems which required group support and deliberation and, at times, staff intervention. The remarkable ability of the racially integrated staff consisting of the principal investigator, project director, project supervisor, educational supervisor, nine tutors and a secretary to function as a coordinated unit to promote their common goals was one of the project's greatest assets.

The project supervisor was responsible for general management at the project, as the principal investigator and project director were not housed at the project. He was to a great extent also responsible for the general atmosphere under which the others worked. He was a soft-spoken, albeit authoritative person, who expended much effort at making the rather dreary and dilapidated project quarters cheerful and homelike.

The walls were filled with pictures of project children, curriculum and holiday materials, and teaching suggestions. He treated the tutors with respect and consideration, and was resourceful in finding ways to assist them. The families cooperated when he made suggestions; and it was he who could get a mother to clean up a special area for the tutoring, or convince her not to withdraw her child from the project. When a tutor felt the need of protection or the support of an authority figure, he could be depended upon to respond effectively and diplomatically.

The educational supervisor, a contemporary of the tutors, played the role of collaborator rather than superior, actually participating by tutoring a subject herself. Their meetings were conducted on the order of workshops at which the tutors had fullest participation, exchanging ideas, making suggestions, assisting one another, freely sharing both successes and failures. She presided over brief daily staff meetings with the tutors at which curriculum and data-collection information were exchanged and problems aired. Once a week the agenda was broadened to include an invited specialist, or discussions of educational techniques and learning theory; and these meetings were attended by the entire staff. She conducted special case conferences focussing on the environmental conditions and educational progress of a single subject from time to time, which were attended by the two concerned tutors and the supervisory staff. With time thus allotted for the special consideration of the progress and development of a particular subject, solutions to difficult tutoring problems frequently evolved.

The principal investigator and the project director developed personal relationships with the tutors, made themselves accessible,

elicited suggestions, listened. The fact that they regularly attended weekly staff meetings and case conferences, participated in curriculum workshops, and aided in the deliberation of family problems, served to communicate to the tutors the scientific importance of the intervention. But most important of all, the tutors were highly motivated, dedicated people with a personal interest in the well-being of the children and of their families.

Home Tutoring Relationships

The process of attempting to establish a good relationship between the designated tutors and the members of the family in each home was the first order of business and proved to be a task about which few generalizations can be made. In some instances the mothers were sincerely interested in the education of their children; they cooperated to the best of their abilities and participated in the tutoring sessions whenever they could. At the other end of the continuum were mothers who showed so little response that one must conclude that they participated in the experiment only because they were paid for the tutoring sessions. In between there were mothers who showed varying degrees of interest and who at times cooperated more with one tutor than another. There were some lonely mothers who so welcomed the tutors' visits that they tended to monopolize the tutoring time with their conversation. In these instances the tutor would play the role of sympathetic listener and at the same time attempt to direct the mother toward active involvement in the tutoring. Whether the mothers would be able to tolerate the invasion of privacy and restriction of movement occasioned by receiving a visiting tutor into the home day after day was an initial concern but caused no great problems.

According to data that was collected, those mothers who failed to become positively involved in the tutoring usually were also either hostilely involved with or ignoring of their children, and the tutoring did not fare well for both reasons. One such mother is described by the tutors at a case conference.

> Mrs. T regards the children as a burden and seems quite insensitive to their emotional needs. B apparently bears the brunt of her frustrations and, as a result, is showing signs of becoming disturbed. Frequently, the tutors have been unable to get into the apartment at the time for the session or have found the children alone. The mother will often become entangled in the explanations she gives and contradict herself, making it obvious that she is not being honest. On Monday, the tutor learned that W had swallowed lighter fluid and had been taken to the hospital. On Tuesday, the tutor worked with W, but Mrs. T was very short-tempered, shouting threats at the children throughout the session.

Many of the subjects were found to be passive and inactive, engaging in repetitious unimaginative play with one toy or object over long periods of time. When the tutoring was initiated the tutors entered their new environments as quietly and unobtrusively as possible, considering their mere presence almost a sufficient source of stimulation.

Few toys were brought along--perhaps a ball, some keys or inexpensive objects in the tutor's pocketbook. Food tins, graduated in size, collected by the mother, were covered with brightly colored paper by tutor and mother together and used by the subject as a nesting or towering toy.

Traumatic events which affected the family, such as evictions, fires, disturbances in family relationships, and shifts in caretakers, usually disturbed the child, rendering the tutoring less effective or interrupting it entirely.

Staff meetings and case conferences helped to solve or at least to modify a variety of problems in the area of tutoring relationships. To illustrate, when it was noted that a particularly unmotivated and uncooperative subject liked cars, the tutors were able to achieve a breakthrough by following the staff's suggestion to conduct future tutoring sessions in a car. In another instance, a tense, withdrawn, and uncommunicative child was assigned to only one tutor, who was instructed to take him along on her rounds to the homes of her other subjects once a week with a stop for lunch or ice cream at a restaurant. Increased affect and language resulted from the more intensive relationship that she was able to establish. A third child, restrained in his crib most of the day, would run about aimlessly when released for tutoring, resisting all attempts to gain his cooperation and focussed attention. When the tutors became discouraged at their inability to effect progress, it was recommended that the project supervisor replace

the tutors temporarily. The restraints that a kindly authoritative male was able to impose proved effective, and the tutors were able at a later date to resume the tutoring with better results. Another type of problem developed when the Welfare Department prepared to take custody of the children of a family being evicted from their quarters, thus threatening the project with the loss of a subject. The staff provided temporary housing for the children and successfully assisted the mother in obtaining new quarters.

Development of Language Skills

As stated earlier, increasing the level of intellectual functioning of the subjects, particularly in the area of language skills, was the major immediate objective and criterion of success of the project. This was to be accomplished through the provision of varied and increasingly complex types of experience and verbal interaction utilizing a broad range of methods, materials, and activities for promoting development, rather than a specific limited curriculum. Thus, while a brief over-view of the programming, techniques, experiences, and materials which were used will be presented here, there is no intention to represent that these are the only specific plans and stimulus materials that could have been used. Rather, the orientation of the tutors was that whatever they did use would be exploited to the fullest for its stimulus value in teaching basic vocabulary, receptive and expressive language, and concept formation.

Even though the tutors were encouraged to vary their methods to meet the needs of the individual subjects, curriculum guidelines developed by the staff, the many interactions and discussions among the tutors, and other mechanisms to be described tended to bring about certain uniformities in the tutoring program. All tutors were instructed to reinforce positive personality characteristics that should help the child succeed in school (e.g., cooperativeness, friendliness, attentiveness, concentration, perseverance, curiosity, resourcefulness, and goal-directed behavior). The child was to be encouraged to develop feelings of competence and of human worth and to assert himself in a positive way. Toys, materials, and experiences were to be used to broaden the subject's comprehension and meaningful use of language. Time was to be spent, preferably at the beginning of the tutoring session, in varied activities with books. The particular selection of books, toys, and ideas that were provided tended to somewhat shape and direct the tutor's efforts. Methods discussed at meetings spread from tutor to tutor, thus developing shared interests and activities. Their very collaboration in pairs for the tutoring of a single child superimposed a common order on their planning. The fact that they for the most part collaborated with a different partner for each child tutored effected a further spread of the same ideas.

Written materials were developed as guidelines, and also to stimulate the tutor's production of like materials. The educational supervisor developed a detailed list of activities with suggested language to accompany each activity. The list included gross motor,

fine motor, and sensory behavior, activities of daily living, and cultural activities. Examples are, "climbing in and out of boxes" accompanied by, "Get up. Get down. You're in the box. Get in. Get out," and "presence and absence of sound," accompanied by, "I hear it. All gone. It's quiet. Shhh. Turn it off. Turn it on." She also developed a rather comprehensive list of specific toys, materials, and learning situations, listing graduated levels of difficulty, e.g., "Puzzles. 1) Can take pieces out of board, 2) Attempts to put pieces in wrong position, 3) Succeeds in putting one piece in successfully, 4) Can put all pieces in correctly." Twenty-four such gradations are listed under "Books."

As the tutoring progressed, curriculum items were developed, incorporating language and concept formation skills designed to accelerate the pace of the tutoring and to provide more action-oriented development of speech. Processes by which simple materials could be easily and quickly transformed into useful toys and articles were described, as were numerous methods for sorting and classifying, differentiating, and discriminating materials. To illustrate, a dozen uses were proposed for jingle bells, using big ones, little ones, colored ones, gold and silver ones, and including sorting, counting, making ornaments and rhythm instruments, playing games, and singing. The tutors caught the spirit of writing the items and began generating many more which they used with the subjects.

The following descriptions of tutoring techniques and materials, summarized from tutors' reports, represent only a sample of the total array. Listed under subheadings of Labelling, Books, Experiences, Jigsaw Puzzles, Games, Music and Rhythm, and Toys, the selection of topics and subdivisions is arbitrary; they are not arranged in chronological sequence; however they were all used toward a common goal, the development of language skills.

Labelling

Teaching the child to be aware of and to learn the names of objects in his environment played an important part at the beginning of the program. "Oh, Oh! There's a mirror. Let's look at Johnny in the mirror. He has two eyes, two ears, a nose and a mouth," the tutor would say while pointing to the head parts. "Show me your nose and your eyes," she would continue, helping him with his response when necessary. A valuable game that most subjects enjoyed was, "Let's look out the window and see what we can see." After the child would mention what he could see, the tutor would point out additional things, such as animals, people, vehicles, stores, houses, flowers, birds, trees, or what people were doing. At times she might call his attention to unusual occurrences, such as wind and rain storms, snow falling, fire trucks, or an ambulance. A less direct method of labelling might take place as part of an activity. "Look what I have--a red rubber ball. Let's sit, spread our legs apart, and roll it. Here it comes. Oh, it rolled under the chair. Can you get it?"

The project children reacted to labelling in different ways. Some took great pride in naming things for parents, relatives, friends, and the tutors. Others played the role of the tutor and asked, "What's that?" indiscriminately pointing to both familiar and unfamiliar objects. No matter which way they reacted, they were learning that things have names, and what they didn't know they could ask about.

Books

The project made a systematic effort to acquaint the children with both picture books and the printed word. Tutors were expected to allot some time to books every day, increasing the amount with the child's maturity and responsiveness. "Get the children hooked on books," became the byword at the project center.

Although the single-object-on-a-page, brightly colored picture book was generally voted the most successful in attracting the very young child, some became interested early in books showing many small objects to a page. They seemed to enjoy each object, isolating it from the others, naming it, describing it, then moving on to another.

Typically the child would sit in the tutor's lap, or beside her, and would be encouraged to handle the book and turn the pages. Relating familiar objects to the pictures was a necessary first step. Thus the tutor would point out that the ball in her hand and the flat round red disk in the picture were one and the same. The labelling games being carried on in the household were extended to books. "That's a chair. Let's find a picture of a chair. Look at those keys! Just like mine!" became a delightful game for a beginner when enlivened by an enthusiastic

tutor. The children particularly enjoyed pretending to eat food represented in the pictures. Soon the bookwork progressed to making up stories about the pictures, using actions and people familiar to the child.

In time the children accepted books as a regular activity. Each book was used until it became familiar, or as long as it held the child's interest. After a while he was given freedom to choose a book from several offered. For most, the beginning of the session, when the child was neither over-stimulated nor fatigued from active play, proved the best time to read. At first interest was fleeting, but later some were able to spend entire sessions with books.

The language used and responses elicited became more complex as the child's vocabulary increased. The simple initial response of "choo-choo" to a pictured train was later expanded to include detailed accounts of a trip to the railroad station, or a discussion of what makes a train go. Special interests were indulged so that while one child would be enjoying a series of books about horses, another would be involved with foods. As the subjects grew older, books about cars, trucks, or almost anything on wheels were among the most prized. The child's favorite books frequently were left in the home.

Reading became more meaningful when pictures and stories related to at least some aspect of the familiar. The richer the child's experiences the greater became the possibility of interesting him in books and the more effective became their use. Using a book in combination with an experience helped to relate the abstract to the real;

and rereading it the next day aided in recall of a pleasant experience. Building up associations between books and experiences continued throughout the tutoring.

Scrapbooks were considered important supplements to the reading and various kinds were made, sometimes with mothers joining in the fun. Pictures or drawings illustrating trips, or of animals, cars, or foods; mementoes of special holidays; photographs of the child and his family; the child's own finger paintings or drawings; pressed leaves or flowers--almost anything was used to increase the child's enjoyment in his "own book." Especially when related to a sequence of events or to various elements of a single activity, scrapbooks served as a link between the picture book and the story book.

Story books and recordings were used successfully in combination. For example, the story of Peter and the Wolf would be read by the tutor as the child looked at the pictures. Then the record would be played, with tutor and child listening to the sequence, pointing to the appropriate pictures, naming the characters, and identifying the actions in the recording.

Experiences

Although all events, including the entire tutoring program to which the child was exposed, could be included in the concept of experiences, this section is limited to events that occurred away from the subject's home which tended to broaden and enrich his understanding of his

environment. Not only were excursions away from home considered a rewarding educational tool, they became indispensable where school-age children crowded the homes at vacation time.

Many neighborhood walks were taken--mailing a letter, watching the milkman make his deliveries, meeting another child, collecting brightly colored leaves, playing in the snow, feeding a squirrel or pigeon, noting the flight of a flock of starlings. Such walks often enabled a child who didn't have a pet to become acquainted with a cat or dog. If the animal appeared friendly, the child might be encouraged to approach it, pat it, note its eyes, nose, mouth, and hair. The walk might be to the playground where the sandbox, swings, seesaw, the playhouse storing games and equipment, and the boys and girls of all sizes would provide substance for expanding knowledge and adding new vocabulary. A walk to a neighborhood store for an ice-cream cone or animal crackers was always a delight, and there were packages and materials on the shelves to be discussed. Visits were sometimes made to the home of the tutor or to a friendly neighbor, where the child might see objects or pets not in his own home. One child who loved horses was taken for pony rides and trips to see horses, finally getting a ride on a horse. Each child was taken to the public library so that he might have the experience of selecting a book, seeing it charged out by the librarian, and taking it home.

The children were brought into the center in small groups for birthday parties, and in large groups for holiday celebrations. There were picnics in the park with the families participating. Other trips

included ones to the zoo, nature center, museums, aquarium, supermarket, 5¢-and-10¢ store, toy store, pet shop, gas station, construction site, bakery, dairy, police station, fire house, school, bus terminal, post office, airport, and the circus.

Jigsaw Puzzles

Over fifty different jigsaw puzzles aided in developing perceptual and problem-solving abilities in the subjects while serving as stimulus materials for vocabulary development and concept formation. The difficulty of the puzzles varied in accordance with the number, size, and complexity of the parts. The simplest ones consisted of whole objects placed into matching spaces. One tutor developed eight recommendations for working with puzzles: 1. present puzzles as enjoyable games; 2. demonstrate how the pieces are placed; 3. give each puzzle piece a name; 4. begin by removing and replacing one piece at a time, gradually increasing the number; 5. finish one puzzle before starting another; 6. if the task proves too frustrating, change to a more relaxed activity; 7. praise the child's successes with a smile, applause, or a treat; 8. present puzzles already mastered for relaxation and reinforcement.

Games

As the spirit of the tutoring was one of fun, games, and cameraderie, much teaching was done through both improvised and traditional children's games. These began with simple peek-a-boo, pat-a-cake, and ball games and graduated to hide-and-seek, treasure hunts, guessing games, and

sorting and matching games. Games helped to engage the many children in the environment as teaching aides. Concepts such as up-down were taught through Ring Around a Rosey, London Bridge, Skip to My Lou, and other circle games. Variations of musical chairs and finger games were popular.

Music and Rhythm

Music was introduced through singing songs and listening to records. Subjects who were not particularly fond of musical activities were not forced to participate. The tutor and a subject, or a group, would become involved in such activities as clapping hands, swaying back and forth, walking fast and slow, marching, and hopping and running to music.

For more advanced musical activities, instruments such as bells, drums, tambourines, and musical sticks were used. These helped introduce the child to different kinds and qualities of sounds. Some instruments were bought; others were made by the tutors and children with the aid of oatmeal boxes, cans, jingle bells, paper plates, milk cartons, sticks, and the like. Instruments were usually introduced one at a time.

Music helped the children develop socially and was an integral part of group activities, such as at Christmas, Easter, and birthday celebrations. Nursery rhymes in song and the songs that accompanied circle games were the ones enjoyed most and were readily committed to memory.

Toys

Children and tutors alike appeared to derive much happiness from commercial toys and equipment. Making toys out of materials already in the environment was seldom undertaken with great enthusiasm, the tutors being quick to point out the need for new and colorful objects in the drab environments.

The impact of toys on the program should not be overlooked or minimized. The toys and their uses were too numerous to describe here in detail, but each in its turn was utilized to support the relationship between tutor and subject and to promote language comprehension and learning. Included were pop beads and beads for stringing, dump-and-fill bottles, play dough and clay, building blocks, nesting toys, balls, puzzles, plastic bolts and screws, tinker toys, peg boards, pounding benches, gear-turning toys, lock-and-key boxes, toy telephones, musical instruments, record players, magnets, magnetic letters, prisms, flashlights, sandpaper, various household tools, balloons, spin tops, magnifying glasses, dolls, toy animals, digging and garden tools, a kiddy car, a tyke bike, a tricycle, a wagon, various mechanical toys, and a multitude of both books and art materials.

Results

Pretesting of both the experimental and control groups on the Bayley Infant Mental Test at 14 months confirmed earlier research findings that low-socioeconomic-status infants do not have low mental test scores prior to fifteen months of age. At 21 months the control group had a mean IQ of 90, which remained near that level through four years of age. This finding, that without intervention a relatively low but stable level of mental-test scores was established by 21 months of age, suggests that intellectual stimulation should begin prior to that time. The tutored group dropped slightly below norms by 21 months -- Mean IQ = 97 -- but with continued tutoring climbed to a mean Stanford-Binet IQ of 106 by 36 months of age. These findings suggest that, optimally, tutoring should begin before 14 months of age, a conclusion that was supported by the tutors' reports that some of the infants showed signs of early deprivation at the time tutoring began. The higher scores of the experimental as contrasted with the control subjects were shown for verbal, nonverbal, and memory components of the Stanford-Binet scores at three years, suggesting that the effects of tutoring were not limited to a single area of mental functioning. This conclusion was supported by findings of significant differences on The Johns Hopkins Perceptual Test and on the Peabody Picture Vocabulary Test. A cluster of task-oriented behavior ratings from the Bayley Infant Behavior Profile, including ratings of object orientation, goal-directedness, attention span, cooperativeness, and adequacy of the test, also showed significant differences between tutored and untutored infants at three years of age.

Although mental-test scores during and at the termination of the period of intensive tutoring supported the initial hypothesis that tutoring would increase mental-test scores, a year after termination of tutoring the approximately 17-point IQ difference between experimental and control subjects had dropped to 10 points, the experimental group dropping from a mean IQ of 106 to 100 on the Stanford-Binet. This drop in scores after termination of early education programs has also been reported by Caldwell and Smith (1968) and by Gray and Klaus (1969), although these authors also report residual differences between groups at followup. The need for evaluation of long-term as well as short-term effects of intervention is shown by these studies.

Ratings were made of maternal behavior with a revised version of the Maternal Behavior Research Instrument (Schaefer, Bell and Bayley, 1959) at 16 months and with a Maternal Behavior with Tutor and Child Inventory (Schaefer and Aaronson, 1966) at 30 and 36 months. Adjective rating scales on child behavior were completed at 16, 19, 22, 27, and 36 months, and a more detailed and comprehensive Infant Behavior Inventory (Schaefer and Aaronson, 1967) was completed at 36 months of age. From extensive statistical analysis, a cluster of ratings that define maternal hostile rejection was found at 16 months--Withdrawal of Relationship, Punishment, Use of Fear to Control, Irritability, and Punitiveness--and for the 30- and 36-month ratings--Hostile Involvement, Hostile Detachment, Low Interest in the Child's Education, Low Verbal Expressiveness, and Low Involvement with the Child. A cluster of

ratings that define child hostility at 36 months was also isolated that included ratings of Hostility from the Adjective Rating Scales and Belligerence, Negativism, and Irritability from the Infant Behavior Inventory. Significant consistency in ratings of maternal hostility at 16, 30, and 36 months was found that supported earlier findings that a mother's behavior with her child tends to be stable through time (Schaefer and Bayley, 1967). The ratings of maternal hostility at the several age periods were also significantly correlated with ratings of the child's hostility at 36 months.

The findings that ratings of the maternal hostility and child hostility that were made by the tutors were significantly correlated with the independent ratings of the task-oriented behavior and with mental test scores at 36 months confirmed the results of the Berkeley Growth Study (Schaefer and Bayley, 1963; Bayley and Schaefer, 1964). The finding that supplementary tutoring and maternal behavior have similar effects upon child behavior and mental-test scores provided further support for both findings. Examination of the cases suggested that the effects of maternal care and supplementary tutoring are additive, i.e., the children who achieved the highest mental-test scores were those who received tutoring and had a positive relationship with the mother.

Discussion and Conclusions

Some of the major conclusions that were derived from this project that might influence the planning of future programs in early child care and education will be discussed. Although some of the conclusions are derived from the statistical data of this and other projects, other

conclusions are based upon observations, interpretations of our experience, and reflections about the implications of research on early development. The first set of conclusions about intellectual development were derived from the statistical data of the project:

1. Negro children from lower-socioeconomic-status families show above average mental-test scores when provided with appropriate intellectual stimulation. The differences between the tutored and untutored groups that were found in this study clearly indicate that children's potential for higher levels of intellectual functioning can be partially developed through even four hours a week of one-to-one tutoring. Of course the limits of intellectual development of the group have not been determined from this limited intervention. The finding that the lowest Stanford-Binet IQ--89--of the tutored group at three years of age was equal to the Mean IQ at three of the untutored group indicates that additional stimulation can provide a substantial change in level of intellectual functioning.

2. The quality of maternal care, as well as supplementary tutoring, significantly influences early intellectual development. Data from this project have provided additional evidence that maternal positive involvement, interest in the child's education, and verbal expressiveness with the child are related to his early intellectual development. The description of a good mother-child relationship would probably also apply to the description of a good tutor-child relationship. The goals of the project and the methods used to achieve those goals were to

some extent guided by previous research on parent behavior, child behavior, and intellectual development.

3. The child's social behavior and the child's early intellectual development show substantial intercorrelations. The relationship between a mother's acceptance of the child and her educational efforts is paralleled by the relationship between the child's competence and his adjustment. Perhaps the controversy between proponents of promoting the social and emotional development of children and of promoting the cognitive development of children is unnecessary, for an optimal education program can and should promote both competence and adjustment.

4. The child's education should begin prior to fifteen months of age. The most reasonable hypothesis would be that the development of early relationships and of interests during the first year of life can influence the child's later intellectual development. The importance of early exposure to language stimulation has not yet been definitely established, but some evidence that early vocalizations may be related to later intelligence would support the need for early language experience. The experience of this project would not support an emphasis upon promoting early sensory-motor development but would support the development of early relationships, interests, and language.

5. The need to plan for continuing education in order to maintain and increase intellectual functioning is strongly supported. The regression on mean IQ scores that was found after termination of intensive tutoring in this and other early-education projects suggests that brief early stimulation projects may have limited, if any, long-term effects upon

intelligence. These findings suggest the need for planning for the total educational experience of the child rather than for limited periods. Clear evidence that early intellectual stimulation has more long-term effects than subsequent intellectual stimulation has not been presented. Clarke and Clarke (1960) have found that young, mentally retarded adults, after leaving severely depriving environments, have shown mean IQ gains of 16 points over a six year period. Klineberg (1935) and Lee (1957) have reported IQ gains during the elementary school years for Negro children who move into northern cities. These studies suggest a need to shift our emphasis from the need for early education to the need for early and continued education in the family as well as in the school.

The experience of the project also leads to conclusions about the needs of infant educators which might apply also to caretakers, parents, and teachers:

1. There is a need for training and experience in child care and education. The great variations in family care and education found in all social groups as well as in this study suggest that skills in child care must be developed through training and supervised experience. Although academic training might be helpful, apprenticeship training is probably necessary to learn the specifics of child care and education. The varied experiences in child care of the tutoring staff of this project contributed to the development of skills during the course of the project. If it were possible, it would be desirable to have a staff replicate a project to see if the experience they had gained led to increased effectiveness.

2. There is a need for supervision, guidance, and opportunities for consultation as well as sharing of experiences among tutors. The morale of the tutoring staff was exceptionally good throughout the course of the project, despite the difficulties encountered. Although the initial motivation of the staff was important, the opportunity to discuss their problems and successes, the shared experiences, the support from supervisors and colleagues, and the attitude that the staff was cooperatively engaged in an important contribution to education were also important for their continued enthusiasm. Would it be possible to organize similar supportive groups for mothers or teachers in our educational institutions? The isolation of mothers in their homes and of teachers in their classrooms, with little opportunity for supportive consultation or sharing with peers, may be one of the major problems in child care and education.

3. There is a need for varied materials and methods and for a range of activities to maintain a high level of interest and enthusiasm of tutors. Throughout the course of the project, new toys and materials or an enthusiastic presentation of new methods would arouse renewed interest in the tutors. Field trips and birthday and holiday parties for the children and their parents were of much interest to the staff as well as the children. Changes in routines, and attractive materials, influence teachers and caretakers as well as children. Perhaps this conclusion would apply equally to mothers, classroom teachers, and other caretakers of young children. Would it be possible to develop inexpensive age-graded book and toy libraries and make them available to parents through neighborhood schools?

Summary

A review of research on intellectual development prompted the development of this home-tutoring project for infants. Findings on the effects of tutoring and maternal care suggest a need for programs that will provide early and continued intellectual stimulation. The hope that enduring changes in the quality of parental care and education might provide continued stimulation suggests a need to supplement child-centered programs with parent- or family-centered programs in early education. The experience of the project also suggests some generalizations about the educational process that might guide future program development.

1. Education is a process that begins at birth and continues until death. The development of relationships, language, interests, task-oriented behaviors, and skills during infancy influences the child's success in academic education. Learning does not end with the completion of the school day, school year, or formal education but continues, with or without planning, throughout the life span.

2. The family is a major educational institution in our society. Statistical data indicate that schools do not change the rate of intellectual functioning that is developed by the family, despite the fact that disadvantaged children have higher intellectual potential than is being developed by their current environments. Support for the child's education in the family should supplement the current emphasis on the school.

3. Educational planning should recognize that each person is both teacher and a student throughout the life span. Educators should assist

in the development of the teaching skills of both parents and future parents and should coordinate the educational functions of the family and the school. Children should be given appropriate training and supervised experience in teaching that will allow them to educate one another and will prepare them for adult roles as parent-educators.

4. The major contribution of this project is not the development of a limited curriculum, although specific methods and materials have been discussed, but rather the development of a different perspective on the educational process. Assumptions about the roles of relationships, of varied and increasingly complex experience, and of the language stimulation that accompanies those relationships and experiences have guided the development of the project and have been supported by the experience of the project. Both the short-term and long-term data of the project suggest the need for a comprehensive system of education that goes beyond the current emphasis upon academic education to include pre-academic, para-academic, and post-academic education in the family and community.

Acknowledgments

We wish to acknowledge with gratitude the many persons who have contributed to this project. The project was developed, with the support of Dr. David Shakow, while the authors were members of the Laboratory of Psychology, National Institute of Mental Health. The project was launched by Mary Leo Vincellete and was continued by Paul H. Furfey and Thomas J. Harte through a National Institute of Mental Health Special Grant to the Catholic University of America. The National Institute of Mental Health project officer, William C. Rhodes; project supervisor, Belford Fisher; educational supervisors: Maureen Nichols and Lillie Davidson; tutors: Lucille Banks, Jane Blais, Patricia Chernoff, Patricia Gentry, Bonita Jones, Veronica Lake, Betty Pair, Carolyn Parnell, Karen Salzmann, Joicey White, and Carol Zucker; research assistants: Julie Forrest and Betty Burgoon; and secretaries: Prudence Tucker, Terry Kidner, and Joe Quinn; have made major contributions to the development of this program. The cooperation of the families and children in this educational innovation was essential.

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